## REMARKS

INTRODUCTION

In accordance with the foregoing, the specification and claims 4 and 13 have been amended and claim 3 has been canceled, without prejudice or disclaimer. No new matter is submitted.

Reconsideration of the allowability of claims 1-2 and 4-25 is respectfully requested.

OBJECTION TO THE SPECIFICATION

The Specification has been amended as suggested in the Office Action. Therefore, withdrawal of this objection is respectfully requested.

OBJECTIONS TO CLAIMS

Claims 4-8 and 13 stand objected to informalities. In accordance with the helpful comments of the Examiner, claims 4 and 13 have been amended to remove the Office Action noted informalities.

Therefore, it is respectfully requested that this objection be withdrawn.

REJECTION UNDER 35 USC 103

Claims 1-2, 10, 12, 13, and 15-17 stand rejected under 35 USC 103(a) as being obvious over Sezan et al., U.S. Patent No. 5,682,205, in view of Hirano et al., U.S. Patent No. 6,509,930. This rejection is respectfully traversed.

By way of review and as an example, independent claim 1 sets forth:

"[a] method of converting an interlaced video signal to a progressive video signal, the method comprising:

estimating motion vectors of a field to be interpolated and an accuracy of the motion vectors using motion vectors of adjacent fields of the video signal;

determining existence or non-existence of global motion by analyzing the estimated motion vectors;

generating a pixel to be interpolated by a first method which performs motion compensation with respect to the field to be interpolated using at least one of the estimated

motion vectors;

generating the pixel to be interpolated by a second method which uses pixels adjacent to the pixel to be interpolated in the field to be interpolated and pixels adjacent to the pixel to be interpolated in the fields preceding and succeeding the field of the pixel to be interpolated; and

selectively outputting one of the pixel generated by the first method or the pixel generated by the second method according to the estimated accuracy of the at least one estimated motion vector and the determined existence or non-existence of global motion,

wherein the estimating of the accuracy of the at least one motion vector comprises accumulating differences among all pixels in a block."

Thus, independent claim 1 sets forth at least the following requirements:

(a) the accuracy of the motion vectors is estimated using motion vectors of ***adjacent*** fields of the video signal; (b) determining existence or non-existence of global motion by analyzing the estimated motion vectors; (c) ***generating*** a pixel to be interpolated by a first method *which performs motion compensation with respect to the field to be interpolated using at least one of the estimated motion vectors*; (d) ***generating*** the pixel to be interpolated by a second method *which uses pixels* ***adjacent*** *to the pixel to be interpolated in the field to be interpolated and pixels adjacent to the pixel to be interpolated in the fields* ***preceding and succeeding*** *the field of the pixel to be interpolated*; (e) and selectively **outputs one of the generated** pixels based on estimated accuracy of motion vectors and whether global motion is determined.

In addition, independent claim 1 further includes (f) wherein the estimating of the accuracy of the at least one motion vector comprises accumulating differences among all pixels in a block.

It is respectfully submitted that the proffered references set forth different de-interlacing methods than the presently claimed invention. Though Sezan et al. and Hirano et al. describe related de-interlacing methods, including the use of motion estimation, it is respectfully submitted that the actual operations/disclosures of Sezan et al. and Hirano et al. are actually different from the presently claimed invention.

In particular, it is respectfully submitted that when the particularly claimed features are taken as a whole, as each claimed feature interacts/interrelates with the remaining claimed features and as each interacting/interrelating feature must enable the performance of the

remaining claimed features, the presently claimed invention is different from the disclosures of Sezan et al. and/or Hirano et al., alone or in combination.

Thus, though individual claimed features may be individually discovered in either Sezan et al. and/or Hirano et al., it is respectfully submitted that the interactions and interrelations of the relied upon features in Sezan et al. and/or Hirano et al. with the other relied upon features of Sezan et al. and/or Hirano et al. do not perform the claimed invention as a whole, i.e., they do not interact and interrelate as claimed.

The Office Action indicates that Sezan et al. discloses estimating motion vectors and their accuracies of a field to be interpolated based on adjacent fields, referencing elements 61-65 of Sezan et al. Col. 12, lines 6- 24. As stated in Sezan et al., "[t]he purpose of this accuracy detection operation is to determine whether or not the global displacement vector provided by GMV unit 64 is sufficiently accurate to describe the motion of the missing pixel, and thus useful in performing motion compensated deinterlacing (i.e., interpolation)." Again, Sezan et al. would appear to estimate a global motion vector and determine whether that global motion vector can be used for interpolation calculations for each individual pixel based on a determined accuracy of this estimated global motion vector for each individual pixel.

Thus, Sezan et al. first estimates a global motion vector, then determines whether that global motion vector can be used for interpolation for individual pixels, i.e., the accuracy of the global motion vector is determined for each pixel.

Independent claim 1 sets forth that motion vectors are estimated and an accuracy of the motion vectors is estimated, then the existence of global motion is determined.

The Office Action would appear to be interpreting the global motion accuracy detection of Sezan et al. as corresponding the claimed accuracy of the motion vectors. Similarly, the Office Action would appear to be interpreting this accuracy estimation as the claimed determination of global motion.

However, in addition to the fact that the combination of Sezan et al. and Hirano et al. fails to disclose the presently claimed invention, it is also briefly noted that independent claim 1 sets forth that the estimation of motion vectors and accuracy of motion vectors is determined based upon "**adjacent**" fields, while the relied upon accuracy detection of Sezan et al. **is based on only subsequent fields**.

Thus, the claimed estimated motion vectors and accuracy of motion vectors are not the same as the estimated global motion vector and accuracy of the global motion vector for each pixel of Sezan et al.

To disclose the claimed generating of a pixel by a first method, which performs motion compensation with respect to the field to be interpolated using at least one of the estimated motion vectors, the Office Action sets forth that Sezan et al. generates "a pixel to be interpolated by a first method of motion compensation according to one [of] the estimated vectors."

Sezan et al., in col. 13, lines 12-16, sets forth an example of the relied upon first method of Sezan et al., where motion compensated interpolation merely replaces pixels for a current even field E1 with pixels from the subsequent odd field O1.

This first method of Sezan et al. is only performed when the previously estimated accuracy of the global motion vector is sufficiently high.

Similarly, Sezan et al. only performs the alternate second method when the estimated accuracy of the global motion vector is sufficiently low, with the second method being merely spatial interpolation within neighboring pixels in the same field.

Thus, in addition to the fact that the claimed estimated motion vectors and accuracies are not the same as the claimed global motion vector and accuracies of global motion vector, of Sezan et al., Sezan et al. only performs one of two methods based on the determination of the accuracy of the global motion vector being accurate/applicable to the particular pixel.

Conversely, independent claim 1 sets forth that both pixel generation operations are performed and one of the generated pixels are selected.

In addition, as noted above, the second method of Sezan et al. only sets forth performing spatial interpolation within the respective field, while independent claim 1 sets forth that the claimed second method "uses pixels adjacent to the pixel to be interpolated in the field to be interpolated and pixels adjacent to the pixel to be interpolated in the fields preceding and succeeding the field of the pixel to be interpolated."

The Office Action acknowledges that Sezan et al. fails to disclose the claimed second method.

Thus, Sezan et al. fails to disclose at least the claimed estimated motion vectors, estimated accuracy of motion vectors, claimed first and second interpolation methods, and the

claimed selection of one of the both generated pixels.

Conversely, Sezan et al. generates a global motion vector, estimates the accuracy of the global motion vector based on only subsequent fields, and selectively performs one of two methods based on the applicability of the global motion vector, also based only on subsequent fields or only the same field, respectively.

To modify the second interpolation method of Sezan et al. to perform interpolation based on different fields, the Office Action relies upon Hirano et al., which the Office Action indicates "selects between motion vector compensation and adaptive spatiotemporal interpolation based on the amount of motion detected, for the clear benefit of generating a more accurate representation for the interpolated pixel."

Thus, to generate "a more accurate representation of the interpolated pixel" the Office Action sets forth it would have been obvious to modify Sezan et al. to perform the second method thereof to use temporal interpolation.

However, it is respectfully submitted that this recited motivation is insufficient to lead one skilled in the art to modify Sezan et al. to perform spatial interpolation with different fields.

It is respectfully submitted that the Office Action has failed to present evidence in the record supporting the need or desire in Sezan et al. for this modification.

Sezan et al. already performs a type of different field comparison with the global motion vector first method. See FIG. 12A and col. 13, lines 1-20. Sezan et al. also details in col. 1 the conventional methods of using pixel values from adjacent fields.

Thus the conclusion of obviousness in the Office Action would appear to rely on the fact that the preferred embodiments of Sezan et al. did not consider the use of adjacent field values. However, Sezan et al. uses subsequent fields for motion compensation, but particularly doesn't use the same for the spatial interpolation within the one field.

In addition, it is respectfully submitted that Hirano et al. does not disclose the aforementioned motivation or rationale for modifying Sezan et al. to not perform interpolation with subsequent fields, or adjacent fields as claimed.

Hirano et al. would appear to differently set forth using two different motion interpolation methods, a motion adaptive interpolation and a motion compensating interpolation, both being based on motion vectors MV.

Thus, as the second method of Sezan et al. is particularly used when the respective motion vectors are not accurate, it would not have been obvious to modify the second method to include the motion vector dependent method of Hirano et al. The principle behind the non-motion compensated second method of Sezan et al. would not appear susceptible to the motion dependent interpolation method of Hirano et al.

Lastly, regarding the claimed "wherein the estimating of the accuracy of the at least one motion vector comprises accumulating differences among all pixels in a block." Here, Sezan et al. actually discloses the accuracy of the motion compensation, while the presently claimed invention sets forth the accuracy of the motion vector. The two are not the same.

Thus, it is respectfully submitted that it would not have been obvious to modify Sezan et al., alone or in view of Hirano et al., to disclose the presently claimed invention. In addition, as noted above, it is respectfully submitted that Sezan et al., alone or in combination with Hirano et al., also fail to disclose all the claimed features of independent claim 1.

It is respectfully submitted that the remaining independent claims similarly are not disclosed by Sezan et al., or a combination of Sezan et al. and Hirano et al., as similar differentiating remarks equally apply, noting each independent claim has different scope and breadth.

Therefore, for at least the above, it is respectfully requested that this rejection of claims 1-2, 10, 12, 13, and 15-17 be withdrawn and claims 1-3, 10, 12, 13, and 15-17 be allowed.

Claims 4-8 and 18 stand rejected under 35 USC 103(a) as being obvious over Sezan et al. and Hirano et al., in view of De Haan et al. Claims 11 and 14 stand rejected under 35 USC 103(a) as being obvious over Sezan et al. and Hirano et al., in view of Bozdagi, U.S. Patent No. 5,784,115. Claims 9 and 19-25 stand rejected under 35 USC 103(a) as being obvious over Sezan et al., Hirano et al., and De Haan et al., in view of Bozdagi. These rejections are respectfully traversed.

It is first noted that De Haan et al. has not been identified in the Office Action or on the PTO892. Regardless, it is respectfully submitted that claims 4-9, 11, 14, and 18-25 are at least allowable for the above remarks.

Therefore, withdrawal of these rejections are respectfully requested.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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